taining it from the freezing mixture in which it had been immersed. Such was the force of this explosion that every glass vessel in the vicinity was completely shattered by the concussion, and it is a matter of great regret that Herr Radenhausen was seriously injured by it. As regards the relative strength of the acid, Prof. Ostwald, who has made determinations of its conductivity, finds that it is a little stronger than acetic acid. In reply to the recent suggestion of Prof. Mendeleeff that the ammonium salt of azoimide, N_3NH_4, might possibly undergo an isomeric change analogous to the conversion of ammonium isocyanate into urea, it is shown that this is not the case. The ammonium salt is a substance crystallizing in beautiful large prisms which possess the property of continually diminishing in size and eventually of entirely disappearing, owing to spontaneous sublimation. Neither sublimation nor boiling with water effect any change of constitution whatever.

THE additions to the Zoological Society's Gardens during the past week include a Red Deer (*Cervus elaphus* ♀), British, presented by Mr. C. J. H. Tower, F.Z.S.; six Night Herons (*Nycticorax griseus*), European, presented by Mr. A. A. van Bemmelen; a Spotted Eagle Owl (*Bubo maculosus*) from South Africa, presented by Mr. Julius Wilson; a Redwing (*Turdus iliacus*), British, presented by Mrs. J. B. Capper; two Yellow-throated Rock Sparrows (*Petronia petronella*) from Africa, deposited; seven Knots (*Tringa canutus*), two Bar-tailed Godwits (*Limosa lapponica*), European, purchased.

OUR ASTRONOMICAL COLUMN.

VARIABILITY OF THE ANDROMEDA NEBULA.—The January number of the *Monthly Notices of the Royal Astronomical Society* contains a note by Mr. Isaac Roberts, entitled "Photographic Evidence of Variability in the Nucleus of the Great Nebula in Andromeda." Between 1885 and 1890 a dozen photographs of this object were taken on several plates; and especially on three negatives taken with exposures of 5, 15, and 60 minutes in December 1890, the nucleus of the nebula has a decidedly stellar appearance. Other plates, exposed for both short and long intervals of time, show no trace of a stellar nucleus. It may therefore reasonably be inferred that the nucleus of the nebula is variable.

ECCENTRICITIES OF STELLAR ORBITS.—In the current number of *The Observatory* Dr. T. J. J. See points out that the arithmetical mean eccentricity of 50 of the best stellar orbits hitherto computed is 0·5, while the mean eccentricity for the orbits of the planets of our system is less than one-tenth of this fraction. A discussion of binary systems has led the author to the conclusion that the great eccentricities observed have been developed by the continual action of tidal friction. The elongated forms of most stellar orbits, and the relatively large mass-ratio of the components of a system, are so different from the orbits and relative masses in the solar system that "the development of the solar system seems to have been an exception and not the rule. From these considerations the writer would venture the opinion that investigators of cosmogony who have looked upon the solar system as typical of the general process of cosmic development, and proceeded therefrom to investigate stellar evolution in general, have pursued an erroneous path."

A NEW NEBULA NEAR MEROPE.—Mr. E. E. Barnard, of Lick Observatory, contributes a note "On the Nebulosities of the Pleiades, and on a New Merope Nebula," to *Astronomische Nachrichten*, No. 3018. Whilst examining the Pleiades on November 14, 1890, Mr. Barnard discovered a new and comparatively bright round cometary nebula close south and following Merope. Since this date the nebula has been observed several times and its position determined. The reason why such a comparatively bright object has never been photographed is that the exposure which it would require to impress itself upon the photographic plate would over-expose Merope so much that the light of the two would coalesce.

NAMES OF ASTEROIDS.—Dr. Palisa has given the following names to asteroids discovered by him last year:—

(290)	Bruna,	discovered	March 20,	1890.
(291)	Alice,	,,	April 25,	,,
(292)	Ludovica,	,,	,, ,,	,,
(295)	Theresia,	,,	August 17,	,,

THE BRITISH MOSSES.[1]

I.

I CANNOT lay the following paper before the readers of NATURE without repeating an apology which I addressed to my audience at the Royal Institution on this subject. I can make no pretence to speak with authority; I speak only as a learner who has devoted to the subject some leisure from amidst avocations of a very different kind. But the pleasure I have derived from the study, the sense, whenever I am in the country, that I am surrounded with a world of variety and beauty of which I was formerly only dimly conscious, and the hope of communicating some of this pleasure to others may, I hope, furnish some apology for my venturing to speak on the subject.

Classification.—Without entering into any question as to the best classification of the mosses, or the relative systematic value of the different groups, the following table, which is arranged in an ascending rank, will be sufficient to show the position of the mosses in the vegetable kingdom, and the principal groups into which they may be divided:—

TABLE A.

		Series.	Orders.	Examples.
Vascular Cryptogams				
Muscineæ	i. Musci	Pleurocarpæ		Hypnum
		Acrocarpæ	Stegocarpæ	Polytrichum
			Cleistocarpæ	Phascum
		Anomaleæ	Schizocarpæ	Andræa
			Holocarpæ	Archidium
	ii. Sphagnaceæ			
	iii. Hepaticeæ	Jungermanniaceæ		
		Marchantiaceæ		
Algæ, &c.				

From this table it will be gathered that the mosses, using that word in its wide signification, stand at the head of the cellular cryptogams, and that above them are the vascular cryptogams, of which the ferns are one of the best-known groups. From these vascular cryptogams the mosses are, however, separated by a distance which Goebel has described as a chasm "the widest with which we are acquainted in the whole vegetable kingdom."

From the table it will be further seen that the larger group of the Muscineæ divides itself into three principal smaller groups: the Hepaticæ or liverworts, the Sphagnaceæ or turf mosses, and the Musci or true mosses—urn-mosses, as they have been called, from the form of their capsule. Passing over the other subdivisions, it may be observed that the Acrocarpous mosses are those which carry their capsules at the end of the axis of growth, whilst the Pleurocarpous mosses bear their fructification on stalks, more or less long, proceeding from the sides of the axis. Amongst these Pleurocarpous mosses occurs the old (broken up by modern systematists into several genera) genus Hypnum, the largest of all the genera in these islands or in Europe—a vast group which occupies amongst mosses something like the place which the Agarics occupy amongst the Fungi.

Number of British Species.—If we were to try and ascertain the number of the British Muscineæ from the systematists of some few years ago, like Hooker and Wilson, the species would number between 500 and 600; but according to the views of more recent writers, the number would probably rise to something between 800 and 900. The true mosses are the most numerous, the turf-mosses by far the fewest.

Date of Flora.—What is the date of this moss flora of Britain? Three ancient collections enable us to give some reply to the question. In an interglacial bed near Crofthead, in Renfrewshire, eleven species of moss were discovered, and with one possible exception all are well-defined British species of the present day. If we take Mr. Wallace's chronology, and hold that 80,000 years have passed since the Glacial epoch disappeared, and 200,000 years since the Glacial epoch was at its maximum, we may perhaps give from 100,000 to 150,000 years for the age of this little collection. Out of the eleven mosses discovered seven belong to the genus Hypnum, or the family Hypnaceæ. This collection, then, is evidence, so far as it goes, (1) that the existing moss flora is as old as the interglacial epoch; (2) that the Hypnaceæ were as dominant then as now; and (3) that the specific forms have remained constant since that epoch.

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[1] The substance (with omissions and additions) of a Discourse by the Right Hon. Lord Justice Fry, delivered at the Royal Institution, January 23, 1891.

Another collection of fourteen mosses has been discovered in a drift in the Clyde valley above the Boulder drift, and tends to confirm the previous conclusions; as all the species are existing, all now inhabit the valley of the Clyde, and the Hypnaceæ are still predominant, though not in so great a proportion as in the Renfrewshire bed.

A third collection has been found at Hoxne, in Suffolk, in a lacustrine deposit, probably resting in a hollow in the boulder clay: together with phanerogams of an arctic habit have been found the remains of ten mosses, which are described by Mr. Mitten as looking "like a lot of bits drifted down a mountain stream." They are all still dwellers in our island, and exhibit, like the other collections, a preponderance of the family of Hypnaceæ.

The fossil remains of mosses are not numerous, or for the most part very ancient. Heer inferred their existence in the Liassic period, from the presence of remains of a group of small Coleoptera, the existing members of which now live amongst mosses—an inference which seems not very strong. But recently the remains of a moss have been found in the Carboniferous strata at Commentry, in France. It appears to be closely allied to the extant Polytrichum, the most highly-developed genus of mosses; so that we have here a phenomenon like that which occurs in reference to the Equisetaceæ and Lycopodiaceæ, viz. that the earliest fossil species known belong to very highly-developed forms of the group.

Life-History.—The following table is intended to illustrate the life-history of a moss in its fullest and in its abbreviated courses, and to bring this history into comparison with that of the ferns:—

TABLE B.—Life-History.

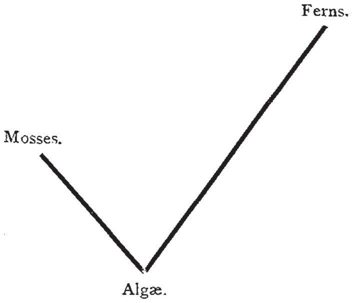
Generation.	Fern.		Moss.					
Oophyte, or Generation with Sexes	Spore		Spore		Gemma			
	Prothallus	Archegonia Antheridia	Protonema		Protonema	Protonema		
			Bud		Bud	Bud	Bud	Moss Plant
			Moss Plant	Archegonia Antheridia	Moss Plant	Moss Plant	Moss Plant	Moss Plant
					Gemma	Protonema	Bud	Moss Plant
Sporophyte, or Generation without Sexes		Fern Plant		Sporogone				
		Sporange		Spore				
		Spore						

The reader's attention should first be drawn to the second column, which shows the life-history in its fullest form. It will be seen that it starts with a spore and returns to a spore.

From (1) the *spore*, which is a simple cell, proceeds (2) the protonema, a line of cells, extending by transverse divisions, so that it consists of single cells joined end to end to one another—an organism indistinguishable from the hypha of an Alga. At points this hypha throws off lateral branches which are always of less diameter than the principal ones. There is thus produced a tangled mat of fibres, running on or near the surface of the ground, and often coloured by chlorophyll. It is the green stuff so often seen in flower-pots which have been allowed to get too damp. At points in the primary hypha individual cells begin to divide in a new fashion—not by transverse septa as before, but by septa differently inclined, so as to produce the rudiments of leaves; and the direction of growth changes from horizontal to vertical. Thus is formed (3) the bud, which by growth gives rise to (4) the moss plant; on this plant, sometimes in close proximity to one another, sometimes in different parts of the same plant, sometimes on different plants, are formed (*a*) the female cell or archegonium, and (*b*) the antheridia or male organs, the antherozoids proceeding from which seek and find and fertilize the archegonium. This completes the first part of the life of the plant, the oophytic generation which results in a single sexual cell, viz. the fertilized archegonium. From this cell arises the next generation, consisting of the sporogone or stem bearing the capsule and the capsule itself, in which without fertilization are produced spores. The plant has thus started with the spore, an asexual cell, reached the point where its whole future is gathered up in a sexual cell, which has produced an organism again producing an asexual cell: we started with a spore, and have returned to a spore; we have travelled round a circle, divisible into two parts or generations, one sexual, the other asexual; and we have therefore a case of alternation of generations. To make this statement more clear, it may be observed that a generation is here spoken of as that part of the life of an organism which intervenes between the two points at which its whole future is gathered up into one cell; that such a cell is sexual when it is the result of the combination of two previously existing and independent cells; that such a cell is asexual when it is not the result of such combination; that an alternation of generations exists, whenever in the complete cycle of existence or life-history there are two points at which the whole organism is reduced to a single cell, and when the forms of the organism in the two intervals of its development are different. In the mosses, where the sporogone co-exists with and is organically connected with what I have called the moss plant, it is evident that the two generations are not such, according to the more popular notion of that word; they are not independent, nor necessarily successive.

A comparison of the first and second columns of the last table reveals at once the likeness and the unlikeness of the life-histories of the moss and of the fern. In each case the spore produces a growth of a form and nature entirely unlike the mother-plant—in one case a hypha, in the other a thallus. But whilst in the moss the protonema produces the moss plant, in the fern the prothallus itself is the home of the male and female organs, and of the sexual process, so that the fern plant belongs to the sporophytic and the moss plant to the oophytic generation; the fern plant is the result of the sexual union, whilst the moss plant is produced from the asexual spore; the fern plant produces spores asexually, the moss plant produces the sporogone as the result of the sexual union.

The observations which arise in connection with this comparison are numerous. (1) It is the belief of botanists, ever since the investigations of Hofmeister, that not mosses and ferns only, but all the phanerogams, go through an alternation of generations consisting of the oophytic and sporophytic generations. (2) It appears that the mosses and the Characeæ are the only groups of plants in which the conspicuous and vegetative organism—the plant, in ordinary parlance—belongs to the oophytic generation: (3) That, in consequence, the plant of the moss is in no sense the ancestor of the plant of the fern, or of the phanerogams, but belongs to a different generation from these; and further, that the leaves, the stem, and the epidermis of the moss have no genetic connection with the leaves, the stem, or the epidermis of our flowering plants, whilst the fibro-vascular bundles of the sporogone of the Polytrichum, and the stomata on the apophyses of some mosses will belong to the same generation which, in the vascular cryptogams and phanerogams, produces similar organs. (4) That the great chasm in the systematic arrangement of the vegetable kingdom between the mosses and the ferns is thus accounted for by their belonging to different generations, so that the ferns are not in any sense descendants of the mosses, but only collateral relatives, as thus—



(5) That, consequently, the mosses not only represent the highest development known of the cellular cryptogams, but the highest point in one line of development, in which the oophytic generation took the lead in importance; whilst the vascular cryptogams and phanerogams are the results of another and more successful line of development, in which the sporophytic generation took the lead as the prominent part in the life-history.

The appearance of similar organs in two independent lines of development—*i.e.* of the leaves, stem, and epidermis—in the mosses, and then in the ferns, without any relation of descent, is a thing well worthy of being pondered over by those who study evolution: it may suggest that the two lines of development, though independent, are governed by some principle which brings about such like results: it may be compared with the likenesses which occur in the animal kingdom between the placental and marsupial mammals.

The remaining columns of the table above given will best be understood after a study of the next succeeding table.

Modes of Reproduction.—Hitherto we have considered only the reproduction from a spore produced in the special organ for their production—the spore capsule. But, in fact, one of the most striking peculiarities of the mosses is the vast variety of their modes of reproduction.

In the following table, which is probably far from exhaustive, I have endeavoured to exhibit many of these modes of reproduction, dividing them into those cases in which it takes place with protonema, and those cases in which it takes place without.

TABLE C.—Modes of Reproduction.

	A.—*With Protonema.*	
i. Spores.	in capsule	
ii. Gemmæ	on end of leaf	*Leptodontium gemmascens.* *Orthotrichum phyllanthum.* *Grimmia Hartmani.*
	on midrib	*Tortula papillosa.*
	in axils of leaves ...	*Bryum.*
	in balls	*Aulacomnion.*
	in cups	*Tetraphis.*
iii. Protonema ...	from rhizoids	*Phascum.* *Polytrichum.*
	from aërial rhizoids ...	*Dicranum undulatum.*
	from terminal leaves ...	*Oncophorus glaucus.*
	from base of leaf ...	*Funaria hygrometrica.*
	from midrib	*Orthotrichum Lyelli.*
	from margin	*Buxbaumia aphylla.*
	from stems	*Dicranum undulatum.*
	from calyptra	*Conomitrium julianum.*
	B.—*Without Protonema.*	
iv. Leaf Buds ...	on rhizoids	*Grimmia pulvinata.*
v. Leaf Buds ...	on aërial rhizoids ...	*Dicranum undulatum.*
vi. Bulbs	on stem	*Bryum annotinum.*
vii. Young Plants ...	at ends of branches ...	*Sphagnum cuspidatum.*
viii. Leafy Branches.	becoming detached ...	*Conomitrium julianum.* *Cinclidotus aquaticus.*
ix. Rooting of main axis	... ...	*Mnium undulatum.*

Weismann's Theory.—The consideration of this table is not without its interest in reference to Prof. Weismann's theory of the division of the cells and plasma of organisms into two kinds: the germ cells and germ plasma endowed with a natural immortality, and the somatic cells and somatic plasma with no such endowment. That the mosses are a difficulty in the acceptance of the theory as a universal truth, the Professor himself admits. The evidence of the mosses seems to amount at least to this: that in this whole group, the highest in this line of development, where the oophytic generation produces the principal plant, and where there are highly specialized organs for the production of spores or germ cells—that in this whole group either there is no effectual separation between the two kinds of plasma, or that the germ plasma is so widely diffused amongst the somatic plasma that every portion of the plant is capable of reproducing the entire organism.

Comparison with Zoological Embryology.—The table will further offer us some points of comparison with animal embryology.

In that branch of physiology, one of the most remarkable facts is what has been called recapitulation, *i.e.* the summary in the life of the individual of the life of the race, so that the development of the individual tells the development of the race—*e.g.* the gills of the tadpole tell us of the descent of the Batrachians from gill-breathing animals.

So here we cannot doubt that the protonema of the moss tells us of the descent of the whole group of mosses from the Algæ.

Another remarkable fact in animal embryology is the co-existence in exceptional cases of the mature and the immature form; so the axolotl retains both gills and lungs throughout its life. In like manner some mosses, *e.g.* the *Phascum*, retains its algoid protonema throughout its life.

Again, in zoological embryology, an attempt is often found, to use the language of Prof. Milnes Marshall,[1] "to escape from the necessity of recapitulating, and to substitute for the ancestral process a more direct method."

In like manner the preceding tables will show to how great an extent Nature has adopted the system of short-circuiting in the reproduction of the mosses; for in every mode of reproduction, except that through sporogone and spore, it will be observed that a shorter circuit is travelled, *e.g.* the *Orthotrichum phyllanthum* produces spores at the end of its leaves, which, falling to the ground, throw out a protonema which produces a bud, and then a moss plant, and then a spore at the end of the leaf, and the whole sporophytic generation is evaded; and so on in gradually shortening circles (see Table B), till we get the case of a Sphagnum, which produces a little Sphagnum plant at the end of its leaves without protonema—whether without bud, I do not know. In every case Nature seems to leave out the sexual reproduction if she can help it, and directs her whole attention to the production of the vegetative organism—the moss plant in the popular sense—which she never omits.

Another point of comparison arises, but this time it is one of contrast between the embryology of the two kingdoms.

In animals, to again quote Prof. Milnes Marshall, "Recapitulation is not seen in all forms of development, but only in sexual development, or at least only in development from the egg. In the several forms of asexual development, of which budding is the most frequent and the most familiar, there is no repetition of ancestral phases, neither is there in cases of regeneration of lost parts."

In mosses, on the contrary, the table last given shows that in most of the modes of reproduction, the ancestral form, the algoid protonema, is retained and reproduced, whereas in the growth from a sexual cell, *i.e.* in the sporogone, the ancestral form entirely disappears.

The peristome, or girdle of teeth round the orifice of the capsule, assumes very varying forms, often of great beauty and interest. In some of the mosses it is absent, in some it consists of one ring of teeth, in many of two rings, and in one foreign genus (Dawsonia) there are as many as four circles of teeth.

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[1] Address to Biological Section of British Association (Nature, vol. xlii. p. 478).

The object served by this complicated structure is not, perhaps, very certain, but it seems to be intended to secure the retention or exclusion of the spores from the spore sac in such conditions of the atmosphere as will best conduce to their germination. In the gymnostomous mosses (*i.e.* those without peristome) it is observed that the spores sometimes germinate within the capsule, an event which is probably adverse to the prospects of the race. The following table will illustrate in a few cases selected as illustrations the different behaviour of the teeth of the peristome under different hygrometric conditions, and suggests what is the probable advantage in each case :—

TABLE D.

Genus.	Condition of teeth		Reason suggested.
	in dry weather.	in wet weather.	
Bartramia ...	Erect ...	Convergent	That spores require *dry* weather when first emitted
Orthotrichum .	Erect or reflexed	Ditto ..	Ditto
Funaria ...	Reflexed ...	Ditto ...	Ditto
Bryum ...	Convergent...	Expanded..	That spores require *wet* weather when first emitted
Fissideus ...	Ditto ...	Ditto ...	Ditto

The motion of the teeth of the peristome appears to be due to the action of a ring of specialized cells which surrounds the mouth of the capsule at the base of the teeth ; and the opposite ways in which these cells act in the same condition of moisture in different genera, is a remarkable circumstance.

To anyone who studies the subject, the immense variety as well as beauty of the peristomes of mosses becomes very impressive. If the sole end be the protection and extrusion of the spores in the proper weather respectively, why is there this infinite wealth and variety of form and of colour? The question can be asked, but hardly can be answered, and the mind of the beholder is left, as it so often is, when contemplating the richness of Nature, in a state of admiration and wonder and ignorance. "Rerum natura tota est nusquam magis quam in minimis."

(*To be continued.*)

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The regulations for the new Isaac Newton Studentships for study and research in astronomy and Physical Optics are published in the *University Reporter* for February 17, 1891. Mr. Frank McClean, the generous founder, has increased his benefaction to £12,500.

The Museums and Lecture Rooms Syndicate report that a sum of £1450 will be required for the fittings of the new buildings in the Departments of Human Anatomy and Physiology.

The following have been nominated as electors to the Professorships indicated ;—Chemistry, Sir H. E. Roscoe ; Plumian, Dr. Cayley ; Anatomy, Prof. Liveing ; Botany, Dr. Vines ; Geology, Dr. Bonney ; Jacksonian of Natural Philosophy, Prof. Ewing ; Mineralogy, Dr. Bonney ; Zoology and Comparative Anatomy, Sir G. M. Humphry ; Cavendish of Physics, Prof. Liveing ; Mechanism, Dr. Besant : Downing of Medicine, Sir G. M. Humphry ; Physiology, Sir G. E. Paget ; Pathology, Sir G. E. Paget ; Surgery, Sir G. E. Paget.

Prof. A. G. Greenhill, F.R.S., and Dr. Routh, F.R.S., are nominated as adjudicators of the Adams Prize to be awarded in 1893.

Mr. Hickson, the newly-appointed Lecturer in Invertebrate Morphology, announces a course on *Cœlenterata* to be given during the remainder of the current term.

SCIENTIFIC SERIALS.

THE *American Meteorological Journal* for January contains :—A report upon the features of tornadoes, and their distinction from other storms, considered in connection with the tornado of Lawrence, Mass., July 26, 1890, by Prof. W. M. Davis. He quotes a description of a tornado observed as early as 1687 at Hatfield, in this country, in which the writer (the Rev. A. de la Pryme) minutely describes the whirling motion of the funnel.—The meteorological observatory recently established on Mont Blanc, by A. L. Rotch. This is a reproduction of a paper read before Section A of the British Association last year, and contains a description of a meteorological observatory being erected by M. Vallot at the Rocher des Bosses, at an altitude of about 14,320 feet above sea-level.—The Gervais Lake tornado, by P. F. Lyons. It occurred on July 13, 1890, and did immense damage to buildings and crops, over an area of scarcely more than half a mile in length. The editors of the *Journal* have added what purports to be a photograph of the funnel, taken by an amateur photographer, who happened at the time to be occupied in taking views, about six miles off.—Rainfall in Michigan, by N. B. Conger, with a chart showing the annual fall in that State. This paper closes a series of monthly summaries by the same author.—Prof. H. A. Hazen concludes his account of observations on Mount Washington ; and M. H. Faye concludes his articles on cyclones, tornadoes, and waterspouts, which were begun in the number for November 1889, and probably form the most complete exposition of his theory which has yet been printed. The editors of the *Journal* invite the criticism of English-speaking meteorologists.

THE *Journal of Botany* has been recently distinguished for the unusual interest of its biographical notices of recently deceased botanists, or those interested in botanical pursuits. In the numbers for November and December 1890, we find such records of the late Miss Marianne North, whose beautiful flower-paintings are so familiar to visitors at Kew, and of the late Mr. James Backhouse, of York. The other papers in these numbers and in that for January 1891 are mostly either descriptive, or relate to the habitats of rare plants. Mr. John Roy gives a list of freshwater Algæ from Enbridge Lake and its vicinity in Hampshire ; Mr. E. G. Baker continues his synopsis of genera and species of Malveæ ; Mr. G. Massee describes and figures a remarkable new genus of Hymenomycetous Fungi from Madagascar, *Mycodendron*.

THE two most important papers in the *Botanical Gazette* for January are a continuation of Mr. J. Donnell Smith's "Undescribed Plants from Guatemala," which include a new species of *Cephaelis*, and one by Mr. R. Thaxter on "Certain new or peculiar North American Hyphomycetes," in which a new genus of Fungi, *Sigmoideomyces*, is described, allied to *Oedocephalum*.

THE number of the *Nuovo Giornale Botanico Italiano* for January is chiefly occupied by papers read at the Verona annual meeting of the Italian Botanical Society. Neither these, nor the independent papers printed in this number, present any features of special interest to the general botanist.

WE have received the numbers for October, November, and December 1890 of the *Botanical Magazine* of Tokio, which give satisfactory evidence of the cultivation of botanical science in the Empire of Japan. The *Magazine* is published monthly, under the auspices of the Tokio Botanical Society, and is printed on rice paper. By far the greater number of the contributions are in Japanese, while others are in what we take to be Japanese printed in English characters. Those in English are chiefly by Prof. R. Yatabe, the President of the Tokio Botanical Society, and include descriptions of several new Japanese species, and of a new genus, *Kirengeshoma*, belonging to the Saxifragaceæ. The illustrations to a paper (in English) by Mr. N. Tanaka, on two new species of Japanese edible fungi, are particularly good.

SOCIETIES AND ACADEMIES.

LONDON.

Zoological Society, January 20.—Mr. W. T. Blanford, F.R.S., in the chair.—Mr. Sclater exhibited specimens of three species of Purple Waterhens (*Porphyrio poliocephalus*, *P. cæruleus*, and *P. smaragdonotus*), of the Eastern Palæarctic Region,